King County
Geographic Information System

2006
Training Curriculum

King County

KCGIS Training Curriculum

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Introduction

Vision and Goal
The vision of the King County GIS (KCGIS) training program is to provide the framework for ongoing and relevant GIS education, which will empower current and potential GIS community members as proactive spatial thinkers who can visualize their data, support better decision-making, and deliver superior public service using GIS tools.

This vision is implemented by developing training opportunities that are modular, customized, and geared toward defined categories of users within the GIS community. The resulting training curriculum is designed to be specific and detailed, yet broad enough to suit the business needs of individuals from many different disciplines. A range of course offerings allows users to stick to GIS basics, or to expand their knowledge with advanced or highly specialized topics.

User Focused GIS Education
The decision on how individuals move through the various curriculum tracks is up to the GIS users and their supervisors, based on both the business needs of the agency, and the career desires of the user. The curriculum plan is not meant to be rigid or pedantic, but rather a set of recommended guidelines. Some courses are highly recommended while others are listed as optional.

The GIS curriculum is written with long-term goals in mind. Users are not expected to immediately sign up for and take all the recommended courses at once, but instead space them over time and take them to the best advantage of both business needs and budgetary constraints. The KCGIS Training Coordinator is a resource for GIS education and can consult with individuals and groups to determine the best approach for improving GIS skills and performance. The Training Coordinator can be reached at 263-5220.

The training curriculum described in this document represents current thinking and planning for GIS education in King County. It is annually updated for publication, but is continuously reviewed and modified by the GIS Training Workgroup. The workgroup welcomes feedback on the curriculum, which can be directed to the KCGIS Training Coordinator.

GIS User Categories
Six categories of GIS users have been identified for the purpose of organizing the GIS training curriculum. Four are technical user categories that require varying levels of GIS skill and knowledge. The other two categories are for individuals who do not personally use GIS, but deal with GIS issues as decision-makers or as technical support staff. The KCGIS training plan is based on building a curriculum for each of these six categories, with an associated set of recommended and optional courses. Many King County staff members were assigned to a GIS user category as a result of a survey conducted in 2004 (the user assignment list is available on the KCGIS intranet at gisdw/intranet/SoftMigr/documents/CategorizedUsers.xls). Individuals can use these assignments to follow the recommended training curriculum, or GIS users and their supervisors can self-assign categories based on the category descriptions that follow.

Data User: These are GIS end-users, who are concerned with querying and viewing GIS data, and perhaps with creating hardcopy output of GIS maps and associated information. Data Users do not create or modify data. While they may use GIS routinely in their day-to-day work, their primary job description is not GIS-oriented.

Data Analyst: Data Analysts can be either GIS professionals or end-users. Like Data Users, they also query and view GIS data, and likely create hardcopy output using GIS resources. However, they tend to employ more sophisticated GIS methods, and create more complex and technically demanding maps than Data Users. They likely create and maintain GIS data for project-level use, but generally do not create

and maintain data that is used beyond the scope of their immediate work group. Data Analysts may also provide support to other GIS users.

Data Maintainer (Steward): Data Maintainers are GIS professionals who are usually also Data Analysts, but are also stewards of enterprise data (that is data used by multiple groups or agencies). They deal with data related issues of conversion, quality assurance and control, and metadata. Data Maintainers likely provide support to other GIS users.

Developer: These are GIS professionals who are responsible for the development of GIS scripts, programs, and applications that are typically used by others. They deal with software development issues such as requirements definition, design, testing, deployment, troubleshooting, and operation. Developers nearly always provide support to other GIS users.

Decision-maker: While Decision-makers may properly be assigned to any of the other user categories, this category is for those individuals who have little or no experience with GIS, but must still deal with GIS issues. Decision-makers may be supervisors or managers who have GIS personnel working for them, or they may be project managers whose projects have a GIS component.

Database/System Administrator: Database/System Administrators, and other IT support personnel may or may not be familiar with GIS concepts and software functionality, yet have a need to deal with GIS from a technical standpoint (such as maintenance of a RDBMS containing a geodatabase, or administration of desktop computers loaded with GIS software) as part of the IT support services they provide.

Curriculum Overview and Status

The KCGIS training curriculum concept was developed in 2004 by the GIS Training Workgroup, and approved by the KCGIS Technical Committee in early 2005. The training curriculum is a combination of custom courses developed by King County personnel and courses offered by ESRI, the developer of the GIS software used by King County. ESRI offers an array of GIS training courses, both online and instructor-led. However, ESRI training is developed using a one-size-fits-most philosophy. Some courses are too technical or too long for the casual GIS user, and some are not comprehensive or specific enough to meet the needs of King County's professional GIS staff. The relatively high cost of ESRI training is also prohibitive. The custom courses are designed to replace and/or supplement the ESRI training and are considered integral to maintaining a high-performance GIS workforce for King County.

The KCGIS training curriculum is a work in progress. Many of the custom courses outlined in this document have yet to be developed. The curriculum is also dynamic. As courses are developed and needs change the curriculum is modified to suit the new circumstance. Steady progress was made on course development beginning in the second half of 2005, and two courses were completed and taught before the end of the year. Two more courses were completed since the beginning of the year and have also been taught. The accompanying table provides a summary.

Custom Course Title (Designation)	**Number of Sessions**	**Number of Students**
Basics of SQL (EA-8)	1	15
Exploring King County Data Using Metadata (B-2)	1	5
Totals for 2005	**2**	**20**
Keeping Up With ESRI (XT-6)	1	7
Geoprocessing for Analysts (EA-9)	1	17
Totals for 2006 (to date)	**2**	**24**

It is expected that ten to twelve more custom courses will be developed by the end of 2006. The GIS Training Workgroup originally identified 33 KCGIS courses that should be developed and offered as part of the overall GIS curriculum. With modifications to the plan, that number has been reduced to 29.

This document is the 2006 update of the training curriculum and represents the recommendations of the GIS Training Workgroup as approved by the KCGIS Technical Committee. The latest published version of the curriculum can be found on the KCGIS Center website at www.metrokc.gov/gis/kb/Content/TrainingPlan.htm.

GIS Skill Sets by User Category

Skill sets required or desirable for each GIS user category provide the basis for defining the GIS courses included in the training curriculum. The following tables show the cross-links from each identified skill to the ESRI or KCGIS courses that provide the skills training. The supporting coursework identified in the tables is not intended to be all-inclusive, as other training resources may apply as well.

Data User

Skill	Supporting Coursework
iMAP and Parcel Viewer User	
Using iMAP, Parcel Viewer	• Using iMAP (B-1) • Property Research Using Parcel Viewer (XT-2)
Querying data	• Using iMAP (B-1)
Finding and using metadata	• Exploring KCGIS Data Using Metadata (B-2)
Exporting data and maps to business documents	• Exporting Data and Maps to Business Applications (B-3)
ArcView User (versions 3.x and 9.x)	
Using ArcView (version 3.x OR 9.x)	• Using ArcView (either 3.x or 9.x) (B-5) • What's New in ArcGIS 9 • Learning ArcGIS 9 • Introduction to ArcView 3.x
Applying cartographic standards	• Cartographic Standards for King County GIS Users (B-7)
Finding data	• Putting King County Data to Work (B-6)
Finding and using metadata	• Exploring KCGIS Data Using Metadata (B-2)
Understanding and using Assessor's data (optional, depending on type of work)	• Understanding and Using KCGIS Assessor's Data (XT-3)
Understanding and using census data (optional, depending on type of work)	• Making Sense of the Census (XT-4)
Using AVLib / LibTool	• Putting King County Data to Work (B-6)
Finding, understanding, and using imagery	• Putting King County Data to Work (B-6)
Finding GIS resources (KCGIS knowledge base, ESRI, Internet)	• Getting the Most Out of the KCGIS Knowledge Base and ESRI Online Resources (XT-1)
Querying data	• Putting King County Data to Work (B-6)
Exporting data and maps to business documents	• Exporting Data and Maps to Business Applications (B-3)

Data Analyst

All skills from Data User (ArcView Users Section), PLUS:

Skill	Supporting Coursework
Using ArcGIS (ArcMap, ArcCatalog, ArcToolbox)	• Keeping Up With ESRI (XT-6) • What's New in ArcGIS 9 • Learning ArcGIS 9 • Introduction to ArcGIS I • Introduction to ArcGIS II

Skill	Supporting Coursework
Understanding and using coordinate systems and projections	• Essentials for Editing and Analysis with ArcGIS (EA-1) • Understanding Map Projections and Coordinate Systems • Working with Map Projections and Coordinate Systems in ArcGIS
Understanding and using geoprocessing tools	• Geoprocessing for Analysts (EA-9) • Advanced Analysis with ArcGIS • Geoprocessing with ArcGIS 9 (for ArcInfo)
Understanding and using table relations	• Managing Table Relationships Without Getting Dumped (EA-7)
Managing and organizing data	• Turning Data into Information Using ArcGIS 9
Raster manipulation (overlay, classification)	• Learning ArcGIS 9 Spatial Analyst
Visualizing and presenting data and information using more advanced cartographic techniques	• Cartography with ArcGIS • The Art and Science of Cartography (XT-7)
Converting data from one format to another; normalizing data	• Essentials for Editing and Analysis with ArcGIS (EA-1)
Geocoding	• Introduction to ArcGIS II
Performing quality control and error analysis for data	• Essentials for Editing and Analysis with ArcGIS (EA-1)
Understanding the basics of SQL	• The Basics of SQL (EA-8)
Customizing the ArcGIS Interface	• Customizing ArcGIS 9
Finding and using pre-existing scripts	• Customizing ArcGIS 9
Getting the most out of the ESRI knowledge base	• Getting the Most Out of the KCGIS Knowledge Base and ESRI Online Resources (XT-1)
Using GPS derived data	• Essentials for Editing and Analysis with ArcGIS (EA-1)

Data Steward

All skills from Data Analyst, PLUS:

Skill	Supporting Coursework
Understanding the basics of SDE	• ArcSDE Administration for SQL Server
Editing data in the GDB: topology, rules, relationships	• Data Collection, Editing and Production • Creating and Editing Geodatabase Features with ArcGIS 9 (for ArcEditor and ArcInfo) • Creating and Editing Geodatabase Topology with ArcGIS 9 (for ArcEditor and ArcInfo) • Creating and Editing Labels and Annotation
Designing and creating GDB structure	• Geodatabase Design Concepts • Building Geodatabases I • Building Geodatabases II • Creating, Editing, and Managing Geodatabases for ArcGIS 9
Understanding and applying best practices for maintaining metadata	• King County GIS Metadata – Creation, Posting, Maintenance, and Best Practices (EA-2)

Skill	Supporting Coursework
Creating and posting metadata - creation and posting (FGDC)	• King County GIS Metadata – Creation, Posting, Maintenance, and Best Practices (EA-2)
Posting data: procedures, checks, troubleshooting	• Data Posting to the King County Spatial Data Warehouse (SDW) (EA-3)
Understanding data versioning	• ArcGIS Essentials for Editing KC Data (EA-1)

Developer

Understanding of, or at least exposure to, as many skills as possible from Data User, Data Analyst, and Data Steward, PLUS:

Skill	Supporting Coursework
Fluency in at least one of the following programming languages / platforms or technical areas (preferably 2 or more); exposure to others: o ArcObjects; Visual Basic; VBA; ArcXML; Python; XML; SQL (advanced); HTML; ASP; .NET; ArcIMS	• Introduction to Programming ArcObjects with VBA • Getting Started with ArcObjects (C-3) • Introduction to ArcIMS • Introduction to Geoprocessing Scripts Using Python • *Self directed learning*
Understanding of programming structures	• Programming Fundamentals (C-2)
Developing applications (as opposed to scripts)	• *Self directed learning*
Understanding and applying software life cycle principles (requirements, design, testing, deployment, implementation, etc.)	• *Self directed learning*
Understanding of OOP programming principles	• *Self directed learning*
Customizing ArcGIS (topics more advanced than for Data Analyst)	• Customizing ArcGIS 9
Understanding and applying usability practices to create good GUI design	• *Self directed learning*
Creating and maintaining technical documentation for applications	• Best Practices for King County GIS Programmers (C-1)
Dealing with interoperability issues	• *Self directed learning*

Decision Maker

Skill	Supporting Coursework
Understanding what GIS is and what it can do	• What is GIS? (N-2) • Using GIS in Your Business (N-3)
Governance structure	• GIS at King County (N-4)
GIS Operations and Maintenance Plan	• GIS at King County (N-4)
Best Practices for managing GIS projects	• GIS for Decision Makers and Program Managers (N-7)
Available KCGIS Web resources	• GIS at King County (N-4)
Working with KCGIS Center Client Services	• GIS at King County (N-4)
Matrix management principles	• GIS at King County (N-4)
Clarifying GIS needs and choosing GIS services (i.e., reading the county's GIS menu of services)	• GIS for Decision Makers and Program Managers (N-7)

Database / System Administrator

Skill	Supporting Coursework
Database Administrator	
General understanding of the theory and practice of SDE	• Managing SDE for Database Administrators (N-5)
Hardware and database requirements needed to run SDE	• Managing SDE for Database Administrators (N-5)
Backup / recovery of databases using SDE	• Managing SDE for Database Administrators (N-5)
When you can/cannot use the SQL command prompt to manipulate SDE files	• Managing SDE for Database Administrators (N-5)
Performance tuning	• Managing SDE for Database Administrators (N-5)
System Administrator	
File-based GIS (i.e. shapefiles)	• GIS for System Administrators (N-6)
What is an info file and why you shouldn't touch it	• GIS for System Administrators (N-6)
When you can/cannot use OS commands on file-based GIS files	• GIS for System Administrators (N-6)
Data / file types used in ArcGIS	• GIS for System Administrators (N-6)
Hardware and OS requirements for server and workstation GIS	• GIS for System Administrators (N-6)
Backup / recovery of GIS files	• GIS for System Administrators (N-6)
Licensing	• GIS for System Administrators (N-6)
Printing issues; dealing with large-format printers and ArcGIS	• GIS for System Administrators (N-6)
Basic, low-level troubleshooting	• GIS for System Administrators (N-6)

GIS Training Curriculum by User Category

The recommended curriculum for each GIS user category is provided below. Students should feel free to bypass courses if they already have the skills taught in that course. Students are also encouraged to explore courses in other categories, providing they have the proper prerequisite skills, the business need, and the approval of their supervisor. Courses listed in Core Curriculum are in rough time sequence. Additional courses may be preliminary courses for those outside the user category, or advanced courses for those within the category.

Data User

Core Curriculum (iMAP user)

- Using iMAP (B-1)
- Exploring KCGIS Data Using Metadata (B-2)

Core Curriculum (ArcView user)

- Using ArcView 9.x (B-5)
- Using iMAP (B-1)
- Putting King County Data to Work (B-6)
- Exploring KCGIS Data Using Metadata (B-2)
- Cartographic Standards for King County GIS Users (B-7)

Additional courses

- Exporting Data and Maps to Business Applications (B-3)
- Getting the Most Out of the KCGIS Knowledge Base and ESRI Online Resources (XT-1)
- Basic OS Skills (B-4)
- Property Research Using Parcel Viewer and iMAP (XT-2)
- The Art and Science of Cartography (XT-7)
- Understanding and Using King County Assessor's Data (XT-3)
- Making Sense of the Census (XT-4)

Data Analyst

The core curriculum from Data User (ArcView) PLUS:

Core Curriculum

- Introduction to ArcGIS I
- Introduction to ArcGIS II
- Essentials for Editing and Analysis with ArcGIS (EA-1)
- Advanced Analysis with ArcGIS
- Geoprocessing for Analysts (EA-9)
- Turning Data into Information
- Understanding Map Projections and Coordinate Systems
- Working with Map Projections and Coordinate Systems
- Tips and Tricks for King County Data Analysts (EA-6)

Additional courses

- Spatial Analyst (ESRI instructor-led course)
- Basics of SQL (EA-8)
- Managing Table Relationships without Getting Dumped (EA-7)
- Keeping Up With ESRI (XT-6)
- GIS for Emergency Operations (RCECC volunteers only) (XT-5)

Data Steward

The core curriculum from Data Analyst, PLUS:

Core Curriculum
- Data Posting to the King County Spatial Data Warehouse (SDW) (EA-3)
- King County GIS Metadata – Creation, Posting, Maintenance, and Best Practices (EA-2)
- Tips and Tricks for King County Data Stewards (EA-5)

Additional courses
- Getting the Most Out of the KCGIS Knowledge Base and ESRI Online Resources (XT-1)
- Keeping Up With ESRI (XT-6)

Developer

The core curriculum from Data User, Data Analyst, and Data Steward as applicable, PLUS:

Core Curriculum
- Introduction to Programming ArcObjects with VBA
- Getting Started with ArcObjects (C-3)
- Best Practices for King County GIS Programmers (C-1)

Additional courses
- GIS for Developers (for non-GIS programmers) (N-1)
- Getting the Most Out of the KCGIS Knowledge Base and ESRI Online Resources (XT-1)
- Programming Fundamentals (C-2)
- Introduction to Geoprocessing Scripts Using Python
- Keeping Up With ESRI (XT-6)

Decision Maker

Core Curriculum
- What is GIS? (N-2)
- Using GIS in Your Business (N-3)
- GIS at King County (N-4)
- GIS for Decision Makers and Program Managers (N-7)

Additional courses
- Property Research Using Parcel Viewer (XT-2)
- Using iMAP (B-1)

Database/System Administrator

Core Curriculum (DBA)
- GIS at King County (N-4)
- Managing SDE for Database Administrators (N-5)

Core Curriculum (System Administrator)
- GIS at King County (N-4)
- GIS for System Administrators (N-6)

Additional courses
- Using iMAP (B-1)
- Exploring KCGIS Data Using Metadata (B-2)

Course Listings

Courses are listed in logical groupings of GIS Basics, Editing and Analysis, Customizing ArcGIS, Extending Your Knowledge, and GIS for Non-GIS Professionals. The course groupings are somewhat analogous to the GIS User Categories, as each grouping targets specific users as outlined in the following table.

Course Grouping	Targeted Students
GIS Basics	Data Users; possibly some Decision Makers and Database/System Administrators.
Editing and Analysis	Data Analysts; Data Stewards; some courses are appropriate for Developers; some courses are appropriate for advanced Data Users.
Customizing ArcGIS	Developers; some courses are appropriate for Data Stewards and Data Analysts.
Extending Your Knowledge	These courses are less specific to user categories and many are appropriate for all students.
GIS for Non-GIS Professionals	Decision Makers and Database/System Administrators

Key to course listings:

Designation: For custom courses only. Indicates course number for reference and tracking.

Scope: For custom courses it indicates whether or not the course is offered to the public or is intended for King County employees only. For ESRI courses it indicates the type of offering (such as instructor-led or on-line seminar).

Location: For custom courses only. Indicates where the course can be taught. "Portable" means the course can travel; “Internet” means the course requires an Internet connection but otherwise can travel; “Workstation” means that students need to use computers during the course; “KSC Training Facility” means the course must be taught in the King Street Center computer training facility.

Offered: For custom courses only. Indicates how often the course is offered.

Refresher Interval: Recommended frequency that a student should take the course.

Status: For custom courses only. Provides information regarding status of course development.

Note: Course listings shaded in gray are ESRI certified courses. KCGIS instructors are authorized to teach Introduction to ArcView 3.x, Introduction to ArcGIS I, and Introduction to ArcGIS II.

GIS Basics

Title: Using iMAP
Designation: B-1
Scope: Public
Location: Internet
Description: Hands-on introduction to the iMAP interface. Includes definitions of the map sets, basic navigation and tools overview, map layout and export, and advanced query and analysis tools.
Course Length: Half day
Cost: TBD
Offered: Quarterly
Refresher Interval: Major release
Status: Course exists as a free one hour “brown bag” that has been informally taught for several years. It needs to be redeveloped as a longer course to cover greater detail on the iMAP functions and tools.

Title: Exploring KCGIS Data Using Metadata **Designation**: B-2
Scope: Public **Location**: Internet
Description: How to find and understand King County GIS metadata. Includes accessing metadata from the Internet and applicable KCGIS tools (AVLib, iMAP, etc), metadata location and organization on the Web, metadata format, finding the data steward, and a brief introduction to the FGDC standard.
Course Length: One hour **Cost**: $65
Offered: Quarterly **Refresher Interval**: Once
Status: Complete.

Title: Exporting Data and Maps to Business Applications **Designation**: B-3
Scope: Public **Location**: Portable
Description: How to export tabular information and maps presented in GIS applications to business applications such as MS Excel, MS Word, and HTML. Includes a brief discussion of exporting images (.JPG and .GIF).
Course Length: One hour **Cost**: $65
Offered: Annually **Refresher Interval**: Once
Status: Currently under development in 2006.

Title: Using ArcView 9.x **Designation**: B-5
Scope: Public **Location**: KSC Training Facility
Description: Covers fundamental GIS concepts as well as how to create, edit, and georeference spatial data. Attendees learn how to manipulate tabular data, query a GIS database, and present data clearly and efficiently using maps and charts.
Course Length: Two days **Cost**: TBD
Offered: Quarterly **Refresher Interval**: Once
Status: Recommended for development in 2006.

Title: Putting King County Data to Work **Designation**: B-6
Scope: Internal **Location**: Workstation
Description: Using KCGIS enterprise data access applications students will learn to access, query, and display King County's GIS vector and raster data.
Course Length: One day **Cost**: TBD
Offered: Twice per year **Refresher Interval**: Once
Status: Course exists as an ArcView 3.x based course and needs to be updated ArcGIS and formalized for inclusion in current curriculum.

Title: Cartographic Standards for KCGIS Users **Designation**: B-7
Scope: Internal **Location**: Portable
Description: Provides information on the King County GIS Cartographic Standards, and how to correctly apply the standards to map layouts. Includes instruction for using the map layout capabilities of the KCGIS enterprise mapping applications.
Course Length: One hour **Cost**: TBD
Offered: Twice per year **Refresher Interval**: Major release
Status: Course exists as a free one hour "brown bag" seminar. It needs to be updated and formalized for inclusion in current curriculum.

Title: Turning Data into Information
Scope: ESRI Virtual Campus course **Cost**: $125
Description: This course examines the scientific methods used to derive useful information from spatial data. Participants will explore GIS theory related to the visualization, measurement, transformation, and optimization of spatial data.
Refresher Interval: Once

Title: Introduction to ArcView 3.x
Scope: KCGIS Instructor-Led course **Cost**: $405 from KCGIS
Description: This course provides the foundation for becoming a successful ArcView GIS 3.x software user. Participants will learn how to create, display, and manipulate spatial and tabular data. In addition, the course shows how to use ArcView's spatial analysis tools to solve many common GIS problems and how to present data in a clear and efficient manner using maps and charts.
Course Length: 2 days **Refresher Interval**: Once

Title: Learning ArcGIS 9
Scope: ESRI Virtual Campus course **Cost:** $175
Description: This course introduces fundamental concepts of GIS and the major functionality contained within ArcGIS software. In course exercises, participants follow the GIS analytical process and work with a variety of ArcGIS tools to solve realistic problems. This course emphasizes practical GIS skills.
Refresher Interval: Once

Editing and Analysis

Title: Essentials for Editing and Analysis with ArcGIS **Designation**: EA-1
Scope: Public **Location**: KSC Training Facility
Description: Basics of ArcMap, ArcCatalog, and other components of the ArcGIS toolbox. Uses county data and examples to explore basic and advanced editing tasks. Includes instruction on coordinate systems and projections, data versioning, and using GPS derived data.
Course Length: 2 days **Cost**: TBD
Offered: Quarterly **Refresher Interval**: Once
Status: Currently under development with completion scheduled for February 2007.

Title: King County GIS Metadata – Creation, Posting, Maintenance, and Best Practices
Designation: EA-2
Scope: Internal **Location**: KSC Training Facility
Description: Provides technical information for creating and maintaining King County GIS metadata to meet county standards. Generally offered back-to-back with "Data Posting to the King County Spatial Data Warehouse".
Course Length: 2 hours **Cost**: TBD
Offered: Annually **Refresher Interval**: Once
Status: Currently under development with completion scheduled for April 2006.

Title: Data Posting to the King County Spatial Data Warehouse
Designation: EA-3
Scope: Internal
Location: KSC Training Facility
Description: Provides technical information for posting, verifying, and troubleshooting data updates to the SDW. Organization of SDW is reviewed. Generally offered back-to-back with "King County GIS Metadata – Creation, Posting, Maintenance, and Best Practices."
Course Length: 2 hours
Cost: TBD
Offered: Annually
Refresher Interval: Once
Status: Currently under development with completion scheduled for April 2006.

Title: Understanding Map Projections and Coordinate Systems
Scope: ESRI Virtual Campus course
Cost: $125
Description: Introduces the fundamental concepts behind map projections, datums, and coordinate systems.
Refresher Interval: Once

Title: Working with Map Projections and Coordinate Systems in ArcGIS
Scope: ESRI Virtual Campus seminar
Cost: Free
Description: Learn how to identify coordinate system problems when datasets do not spatially align properly and the steps to correct the problems.
Refresher Interval: Once

Title: Managing Table Relationships Without Getting Dumped
Designation: EA-7
Scope: Public
Location: KSC Training Facility
Description: Users will learn basic theory of relating tables, how to work with primary and foreign key fields, and how to create and use table relationships in ArcGIS.
Course Length: One hour
Cost: TBD
Offered: Annually
Refresher Interval: Once
Status: Recommended for development in 2006.

Title: The Basics of SQL
Designation: EA-8
Scope: Public
Location: Portable
Description: How to use SQL to create queries. Understanding common commands, syntax and usage.
Course Length: Two hours
Cost: $90
Offered: Twice per year
Refresher Interval: Once
Status: Complete.

Title: Geoprocessing for Analysts
Designation: EA-9
Scope: Public
Location: KSC Training Facility
Description: Covers the ArcGIS Toolbox, Geoprocessing Tools, the Command Line, and Model Builder. Includes customization of the geoprocessing environment toolbox, and familiarizes students with tools to complete a real world GIS analysis project.
Course Length: Half day
Cost: $135
Offered: Annually
Refresher Interval: Once
Status: Complete.

Title: Advanced Analysis with ArcGIS
Scope: ESRI Instructor-Led course **Cost**: $1,350
Description: Use the advanced tools in ArcGIS 9 for geoprocessing, modeling and analysis to solve problems in interesting and challenging real world scenarios.
Course Length: 3 days **Refresher Interval**: Once

Title: Data Collection, Editing and Production
Scope: ESRI Instructor-Led course **Cost**: $1,350
Description: This course teaches how to create and maintain geodatabase data. Participants will explore populating the geodatabase in a variety of ways. These include data conversion from legacy data formats such as coverages and shapefiles as well as from CAD formats.
Course Length: 3 days **Refresher Interval**: Once

Title: Geodatabase Design Concepts
Scope: ESRI Instructor-Led course **Cost**: $900
Description: This course explains the steps involved in the geodatabase design process, from preliminary planning to schema creation. Participants learn how to take advantage of existing ArcGIS data models along with data modeling tools.
Course Length: 2 days **Refresher Interval**: Once

Title: Introduction to ArcGIS I
Scope: ESRI or KCGIS Instructor-Led course **Cost**: $900 from ESRI; $405 from KCGIS
Description: This course covers fundamental GIS concepts as well as how to query a GIS database, manipulate tabular data, edit spatial and attribute data, and present data clearly and efficiently using maps and charts.
Course Length: 2 days **Refresher Interval**: Once

Title: Introduction to ArcGIS II
Scope: ESRI or KCGIS Instructor-Led course **Cost**: $1,350 from ESRI; $540 from KCGIS
Description: This course focuses on spatial analysis, automation of spatial and attribute data, editing, and advanced options for cartographic display. A portion of the class is reserved for carrying out an analysis project and applying many of the new skills and techniques learned in this course.
Course Length: 3 days **Refresher Interval**: Once

Title: Creating and Editing Geodatabase Features with ArcGIS 9 (for ArcEditor and ArcInfo)
Scope: ESRI Virtual Campus course **Cost**: $50
Description: ArcGIS 9 introduces new and improved sketch and edit tools for the geodatabase. This course teaches how to use those tools to build a geodatabase from the ground up.
Refresher Interval: Once

Title: Creating and Editing Geodatabase Topology with ArcGIS 9 (for ArcEditor and ArcInfo)
Scope: ESRI Virtual Campus course **Cost**: $50
Description: ArcGIS software provides full support for geodatabase topology, including an advanced editing environment for maintaining topological relationships among features. This course explains how topology is implemented in the geodatabase and teaches how to use geodatabase topology to more accurately model the real world.
Refresher Interval: Once

Title: Creating and Editing Labels and Annotation
Scope: ESRI Virtual Campus course **Cost**: $50
Description: ArcGIS software provides powerful tools for adding descriptive text that enhances maps and makes them more usable. This course teaches how to create labels and annotation, as well as how to manage them to streamline map creation.
Refresher Interval: Once

Title: Creating and Editing Linearly Referenced Features with ArcGIS 9
Scope: ESRI Virtual Campus course **Cost**: $50
Description: This two-module course introduces the fundamental elements of linear referencing: routes and measures. Participants learn how to create and edit route geometry and measures and query routes to get location-specific information.
Refresher Interval: Once

Title: Creating, Editing, and Managing Geodatabases for ArcGIS 9
Scope: ESRI Virtual Campus course **Cost**: $75
Description: This course covers all the basics and introduces the more advanced functionality that makes the geodatabase such a powerful data model. Participants will be able to get started working with geodatabases right away and understand the range of functionality that the geodatabase offers.
Refresher Interval: Once

Title: What's New in ArcGIS 9
Scope: ESRI Instructor-Led course **Cost**: $1,350
Description: The first half of this course focuses on the geoprocessing environment and the hundreds of new tools available to users. Participants learn how to access these tools in a variety of ways such as through models, scripts, and a new command line environment. Enhancements to the geodatabase, such as XML import/export and the ability to store raster data, are discussed. The ArcGIS 3D Analyst and Maplex for ArcGIS extensions, showcasing the new three-dimensional symbols and ArcGlobe and labeling enhancements, are also discussed.
Course Length: 3 days **Refresher Interval**: Once

Customizing ArcGIS

Title: Best Practices for King County GIS Programmers **Designation**: C-1
Scope: Internal **Location**: Portable
Description: Includes interoperability, usability, technical documentation, application design, and software life cycle practices.
Course Length: One hour **Cost**: TBD
Offered: Annually **Refresher Interval**: Annually
Status: Recommended for development in 2006 by the GIS Developers Group. The “course” may end up taking the form of a document of standards, best practices, and procedures for GIS programmers to adopt and follow.

Title: Programming Fundamentals **Designation**: C-2
Scope: Public **Location**: KSC Training Facility
Description: Hands-on introduction to programming. Includes programming structures, variable scope, and event-driven and object-oriented programming theory. Prerequisite: Basic OS Skills.
Course Length: One day **Cost**: TBD
Offered: Annually **Refresher Interval**: Once
Status: Planned for development in 2007 or 2008.

Title: Getting Started with ArcObjects **Designation:** C-3
Scope: Public **Location:** KSC Training Facility
Description: What programmers really need to know about ArcObjects programming to be productive. This can be one-on-one or small groups, and should be taken after the ESRI instructor-led course. Prerequisite: fundamental programming skills.
Course Length: Two hours **Cost**: TBD
Offered: Annually **Refresher Interval:** Once
Status: Planned for development in 2007 or 2008.

Title: Introduction to Programming ArcObjects with VBA
Scope: ESRI Instructor-Led course **Cost**: $2,250
Description: Learn the fundamentals of Visual Basic for Applications (VBA) application development and the specifics of working with ArcObjects.
Course Length: 5 days
Refresher Interval: Once

Title: Customizing ArcGIS 9
Scope: ESRI Virtual Campus course **Cost**: $50
Description: Designed for nonprogrammers, this course reveals how to customize ArcMap and ArcCatalog. By rearranging interface controls and taking advantage of available code samples, participants learn how to tailor ArcGIS to match individual preferences and workflows.
Refresher Interval: Once

Title: Introduction to Geoprocessing Scripts Using Python
Scope: ESRI Instructor-Led course **Cost**: $900
Description: Students will learn about the Python scripting language and how it can be used to access the geoprocessing functionality in ArcGIS 9.
Refresher Interval: Once

Extending Your Knowledge

Title: Getting the Most Out of the KCGIS Knowledge Base and ESRI Online Resources
Designation: XT-1
Scope: Public **Location**: Internet
Description: Provides orientation to GIS technical information available on the Internet using the King County and ESRI websites.
Course Length: One hour **Cost**: TBD
Offered: Twice per year **Refresher Interval**: Once
Status: Planned for development in 2007 or 2008.

Title: Property Research Using Parcel Viewer and iMAP **Designation**: XT-2
Scope: Public **Location**: Workstation
Description: Hands-on introduction to the Parcel Viewer interface. Includes property search techniques, understanding the property page results, and where to go for more property information. Introduces the property research capabilities of iMAP.
Course Length: One hour **Cost**: TBD
Offered: Twice per year **Refresher Interval**: Major release
Status: Currently exists as a free one hour “brown bag”. It needs to be updated and formalized for inclusion in current curriculum.

Title: Understanding and Using King County Assessor's Data
Designation: XT-3
Scope: Public
Location: Portable
Description: Introduction to the various Assessor tables and the data that they represent. Includes where to find assessor's data, conversion techniques, and how to attach them to GIS data, query against them and create useful and informative maps. Includes an overview of the ParcelTools extension. Users may take home Microsoft Access macros to aid conversion.
Course Length: Half day
Cost: TBD
Offered: Twice per year
Refresher Interval: Once
Status: Currently exists as a one day course, but needs to be updated and formalized for inclusion in current curriculum.

Title: Making Sense of the Census
Designation: XT-4
Scope: Public
Location: Portable
Description: Users will learn to make effective use of King County 2000 Census data. This course will review the census geography and tabular data needed to perform basic analysis. It will also provide an introduction to the online Census Viewer interface.
Course Length: One hour
Cost: TBD
Offered: Twice per year
Refresher Interval: Once
Status: Course exists as a free one hour “brown bag” that has been informally taught for several years. It needs to be updated and formalized for inclusion in current curriculum.

Title: GIS for Emergency Coordination Center Volunteers
Designation: XT-5
Scope: Internal; (ECC volunteers only)
Location: KSC Training Facility
Description: ECC volunteers will receive a mapping assignment in advance of the course, which they will complete and bring with them. The course will focus on new and refresher information pertaining to manning the GIS station at the ECC during activation.
Course Length: One hour
Cost: TBD
Offered: Quarterly
Refresher Interval: Quarterly
Status: Course has been offered to ECC volunteers in the past. It needs to be updated for inclusion in current curriculum.

Title: Keeping Up with ESRI
Designation: XT-6
Scope: Public
Location: KSC Training Facility
Description: Covers changes and updates to the ArcGIS interface that will affect how users, analysts, and stewards interact with their GIS data and environment. Includes ample time for student Q&A.
Course Length: Half day
Cost: $135
Offered: Quarterly
Refresher Interval: Major Release
Status: Complete.

Title: The Art and Science of Cartography
Designation: XT-7
Scope: Public
Location: Portable
Description: Covers basic to advanced cartographic techniques for the casual mapmaker or GIS professional needing a refresher. Includes required map elements; proper text sizing, font conventions, and text placement; the effective use of color; legend creation; and tips on how to make a good-looking map without sacrificing content or time.
Course Length: Two hours
Cost: TBD
Offered: Annually
Refresher Interval: Once
Status: Recommended for development in 2006.

Title: ArcIMS Administration
Scope: ESRI Instructor-Led course **Cost**: $1,350
Description: Learn how to configure an ArcIMS server for performance, security, and reliability.
Course Length: 3 days **Refresher Interval**: Once

Title: Building Geodatabases I
Scope: ESRI Instructor-Led course **Cost**: $1,350
Description: This course addresses loading data into the geodatabase; defining appropriate topology rules; and maintaining data integrity through subtypes, attribute domains, and relationship classes. Participants learn how to create, use, edit, and manage spatial and attribute data stored in the geodatabase.
Course Length: 3 days **Refresher Interval**: Once

Title: Building Geodatabases II
Scope: ESRI Instructor-Led course **Cost**: $900
Description: Extend the content of Building Geodatabases I with advanced understanding for modeling and working with linear features in the geodatabase. This course teaches the nuances of working in geometric networks.
Course Length: 2 days **Refresher Interval**: Once

Title: Cartography with ArcGIS
Scope: ESRI Instructor-Led course **Cost**: $1,350
Description: This course teaches how to apply principles of map design while using the cartographic tools in ArcMap to create outstanding maps.
Course Length: 3 days **Refresher Interval**: Once

Title: Introduction to ArcIMS
Scope: ESRI Instructor-Led course **Cost**: $900
Description: This updated course will give a comprehensive introduction to ArcIMS and its powerful capabilities for managing the way users access and interact with Internet mapping and GIS data.
Course Length: 2 days **Refresher Interval**: Once

Title: Managing a Versioned Geodatabase
Scope: ESRI Instructor-Led course **Cost**: $1,350
Description: This course will educate participants on how a versioned geodatabase operates, various work flow scenarios, and how to manage and maintain performance in a multi-editor environment. Materials will focus on how ArcSDE implements versioning through the use of geodatabase system metadata tables and user delta tables.
Course Length: 3 days **Refresher Interval**: Once

Title: Working with ArcGIS Spatial Analyst
Scope: ESRI Instructor-Led course **Cost**: $1,350
Description: This course teaches basic raster concepts and shows how to use ArcGIS Spatial Analyst tools to create, run, and edit spatial models. It focuses on problems that are best solved in a raster environment such as surface analysis and distance measurement.
Course Length: 3 days **Refresher Interval**: Once

Title: Geoprocessing with ArcGIS Desktop
Scope: ESRI Virtual Campus course **Cost**: $100
Description: Geoprocessing is a primary function of a GIS. ArcGIS Desktop software provides hundreds of tools for processing geographic data as well as ModelBuilder, a graphical environment for visualizing and executing work flows. This five-module course teaches practical strategies for using the ArcGIS geoprocessing framework to accomplish GIS work flows.
Refresher Interval: Once

Title: Introduction to ArcGIS 9 Geostatistical Analyst
Scope: ESRI Virtual Campus course **Cost**: Free
Description: With ArcGIS Geostatistical Analyst, GIS users can explore, visualize, and create sophisticated optimal prediction surfaces, as well as statistical surfaces of probability and standard error.
Refresher Interval: Once

Title: Learning ArcGIS 9 3D Analyst
Scope: ESRI Virtual Campus course **Cost**: $150
Description: Working mostly with models of terrain, participants display surfaces in three-dimensional perspective, symbolize them, and set three-dimensional properties. Participants also create realistic models by draping aerial photographs over surfaces and displaying two-dimensional features in three dimensions.
Refresher Interval: Once

Title: Learning ArcGIS 9 Spatial Analyst
Scope: ESRI Virtual Campus course **Cost**: $125
Description: This six-module course teaches how to produce and control raster data using ArcGIS Spatial Analyst. Participants create a variety of raster surfaces including hillshade relief maps, slope and aspect surfaces, and density and distance surfaces.
Refresher Interval: Once

Title: Solving Disaster Management Problems Using ArcGIS 9
Scope: ESRI Virtual Campus course **Cost**: $125
Description: Participants will learn to apply GIS to protect life, property, and critical Infrastructure from natural disasters such as earthquakes, hurricanes, volcanoes, floods, and wildfires, as well as human-caused disasters, including technological hazards or acts of terrorism. Key GIS applications include natural hazard identification and mapping, multi-hazard analysis, shelter planning, mitigation, damage assessment, and recovery monitoring. Additionally, participants will learn how to present GIS data in ways that support emergency management analyses.
Refresher Interval: Once

Title: Turning Data into Information Using ArcGIS 9
Scope: ESRI Virtual Campus course **Cost**: $125
Description: This course examines the scientific methods used to derive useful information from spatial data. A companion to the book Geographic Information Systems and Science published by John Wiley & Sons Ltd, the course is designed to complement this book and reinforce its concepts through exercises and examples. Participants will explore GIS theory related to the visualization, measurement, transformation, and optimization of spatial data.
Refresher Interval: Once

Title: ArcSDE Administration for SQL Server
Scope: ESRI Instructor-Led course **Cost**: $2,250
Description: This course teaches how to configure SQL Server to support ArcSDE, install and configure ArcSDE, load vector and raster data, monitor and optimize queries, and manage a multi-versioned geodatabase. Participants learn to monitor access to their ArcSDE database by using ArcSDE and DBMS tools.
Course Length: 5 days **Refresher Interval**: Once

GIS for Non-GIS Professionals

Title: GIS for Developers **Designation**: N-1
Scope: Public **Location**: Portable
Description: Understanding the theory, practice, and software of GIS. This course is for programmers who do not have a GIS background and will be programming with ArcObjects or ArcIMS.
Course Length: One hour **Cost**: TBD
Offered: Annually **Refresher Interval**: Once
Status: Planned for development in 2007 or 2008.

Title: What is GIS? **Designation**: N-2
Scope: Public **Location**: Portable
Description: This course should be offered with an appropriate business-specific course (see N-3). It typically should not be offered alone. Introduces the student to the core principles of GIS. Includes non-technical definition of GIS, and general examples of the types of business information that can be related to GIS layers, analyses that can be performed, and information and maps that can result using GIS.
Course Length: 30 minutes **Cost**: TBD
Offered: As needed **Refresher Interval**: Once
Status: Recommended for development in 2006.

Title: Using GIS in Your Business **Designation**: N-3
Scope: Public **Location**: Portable
Description: This course should be offered with the What is GIS? component (see N-2). It typically should not be offered alone. Extension of the core component of the course, but focused on targeted industry. Offers examples and case studies that showcase specific GIS applications (such as emergency management, public health, transportation, etc.).
Course Length: 30 minutes **Cost**: TBD
Offered: As needed **Refresher Interval**: Once
Status: Planned for development in 2007 or 2008.

Title: GIS at King County **Designation**: N-4
Scope: Public **Location**: Portable
Description: This course is intended for agencies outside the GIS Technical Committee, and members of the public. It introduces the student to GIS at King County. Includes information on the general structure and function of GIS at the KCGIS Center and King County agencies; types of GIS data available at King County, and how to obtain it; where to go for more information about GIS in King County (e.g., Web site).
Course Length: One hour **Cost**: TBD
Offered: As Needed **Refresher Interval**: Once
Status: Planned for development in 2007 or 2008.

Title: Managing SDE for Database Administrators **Designation**: N-5
Scope: Public **Location**: Portable
Description: Introduces non-GIS database administrators to the basics of SDE, including database requirements, setup, management, performance tuning, and backup and recovery.
Course Length: One hour **Cost**: TBD
Offered: Annually **Refresher Interval**: Once
Status: Planned for development in 2007 or 2008.

Title: GIS for System Administrators **Designation**: N-6
Scope: Internal **Location**: Portable
Description: Introduces non-GIS system administrators to the basics of GIS, focusing on hardware and system requirements, data and file types, backup and recovery, printing and plotting, software licensing, and basic troubleshooting.
Course Length: One hour **Cost**: TBD
Offered: Annually **Refresher Interval**: Once
Status: Planned for development in 2007 or 2008.

Title: GIS for Decision Makers and Program Managers **Designation**: N-7
Scope: Public **Location**: Portable
Description: This course is intended primarily for an internal audience, but may be of interest to non-King County agencies. Introduces non-GIS decision-makers to the basics of GIS, focusing on the KCGIS governance structure, clarifying GIS needs, choosing GIS services including the KCGIS Center Client Services group, and best practices for effective management and use of GIS resources.
Course Length: One hour **Cost**: TBD
Offered: Annually **Refresher Interval**: Once
Status: Planned for development in 2007 or 2008.

Curriculum Development Priorities

Breakdown of GIS Users by Category

The table below summarizes the number of King County employees in each GIS users category, as identified by a survey conducted in 2004. It should be noted that many users have secondary categories of Decision Maker and Database/System Administrator in addition to their primary category of Data User, Data Analyst, Data Steward, or Developer. These persons are not counted in the Decision Maker and Database/System Administrator categories, as these categories are strictly for those individuals having little or no experience with GIS, but who must deal with GIS issues (such as personnel, project, or technical) as part of their job.

User Category	Number of persons
Data User	326
Data Analyst	73
Data Steward	34
Developer	40
Decision Maker	3
Database/System Administrator	6
Total:	**482**

Training Resources and Priorities

The resources and requirements for custom course development are shown on the "Training Resources and Priorities for In-House Courses" worksheet, which is attached to this document as Appendix A. (Note: the worksheet is updated several times during the year. For the most recent version see http://gisdw/intranet/SoftMigr/documents/TrainingResourcesPriorities.xls on the KCGIS website.)

For each course, an "urgency/difficulty value" was assigned based on informed assumptions about the level of difficulty and time needed to develop the course materials, the availability of course developers, and the perceived urgency of course need. These assumptions were distilled to a simple "urgency-difficulty" matrix which provides a basis to prioritize course development.

Urgency-Difficulty Matrix		Difficulty to develop	
		Easy	Hard
Urgency of need	Critical	CE (5)	CH (6)
	Wait	WE (16)	WH (6)

Note: Number of courses is shown in parentheses

Courses Recommended for Priority Development

Custom course development is occurring in rounds, with each successive round of courses beginning development as work on the previous round is wrapping up. To date one prototype course (referred to as Round 0) and three Round 1 courses have been completed and taught at least once. Four Round 2 courses are in development. Later in 2006 the GIS Training Workgroup will recommend to the KCGIS Technical Committee that development begin on another six to eight courses as Rounds 3 and 4.

The status of course development is as follows:

Round 0:

The Basics of SQL (EA-8): (Critical-Easy; development by Lisa Castle and Debbie Bull.) This course is complete and was first taught in October 2005.

Round 1:

Exploring KCGIS Data Using Metadata (B-2): (Critical-Easy; development by Mike Leathers and Lisa Castle.) This course is complete and was first taught in November 2005.

Keeping Up with ESRI (XT-6): (Critical-Hard; development by Cheryl Wilder.) This course is complete and was first taught in February 2006.

Geoprocessing for Analysts (EA-9): (Critical-Hard; development by Adam Cabrera.) This course is complete and was first taught in February 2006.

Round 2:

Essentials for Editing and Analysis with ArcGIS (EA-1): (Critical-Hard; development by Frank Whitman and David Ostanski.) This course is under development and is scheduled to be in February 2007. It is a two day course, and requires a great deal of preparation and material. It cannot be feasibly developed until the course developers have had adequate ramp-up time with ArcGIS 9.x.

Data Posting to the King County Spatial Data Warehouse (EA-3) (Critical-Easy; development by Debbie Bull and Mike Leathers.) This course is under development and is scheduled to be completed in April 2006. The course cannot be completed until the data posting procedures for ArcGIS 9.x have been fully formed and implemented.

Exporting Data and Maps to Business Applications (B-3) (Wait-Easy; development by Chris Jansen.) This course is under development with no fixed date for completion.

King County Metadata – Creation, Posting, Maintenance and Best Practices (EA-2) (Critical-Hard; development by Mike Leathers and Debbie Bull.) This course is under development and is scheduled to be completed in April 2006.

Courses Recommended for Development for Rounds 3 or 4:

Property Research Using Parcel Viewer (XT-2): (Wait-Easy; development by Michael Jenkins and Chris Jansen.) This course is currently offered as a free brown bag seminar, but will be updated and formalized to mesh with the current curriculum.

Getting the Most Out of the KCGIS Knowledge Base and ESRI Online Resources (XT-1): (Wait-Easy; development by Cheryl Wilder and Patrick Jankanish.) This course will show users the types of KCGIS-specific information that resides in the Knowledge Base, how to access it, and how to add their own tips, as well as how to mine the ESRI Web site for information.

Using ArcView 9.x *(B-5)*: (Critical-Hard); development by Cheryl Wilder.) This two day course will teach the typical ArcView user what they "really" need to know to make practical and efficient use of the software. King County data will be used for demos and exercises and relevant course material will come from several sources. The course will be a time saving and cost effective alternative to ESRI certified training.

Managing Table Relationships Without Getting Dumped (EA-7): (Wait-Easy; development by Shari Cross.) This course will provide practical guidance for using tables in ArcGIS analysis and mapping. The student will learn basic theory of table relates, as well as do's and don'ts for creating and managing table relationships.

Best Practices for King County GIS Programmers (C-1): (Wait-Easy; development by the GIS Developers Group.) This "course" may actually take the form of a document describing standards, best practices, and procedures for GIS programmers to adopt and follow. The materials developed would be geared towards fostering cooperation and creating efficiencies for programmers developing GIS applications for King County.

Understanding and Using King County Assessor's Data (XT-3): (Wait-Easy; development by Chris Jansen.) This course is currently taught using ArcView 3.x extensions. It needs to be updated to provide the latest techniques and information for using Assessor's data.

What is GIS? (N-1): (Wait-Easy; development by Greg Babinski.) This course will provide an introduction to GIS concepts and practices. It is geared toward decision makers with little or no knowledge of GIS. It is the first component of what would normally be a two part presentation on GIS with the second component focused on a targeted industry.

The Art and Science of Cartography (XT-7): (Wait-Easy; development by Patrick Jankanish.) This course will provide basic and advanced instruction in cartographic techniques from an award winning map maker.